2002 HERD UNIT CLASSIFICATION OF ROOSEVELT ELK IN REDWOOD NATIONAL AND STATE PARKS (RNSP)

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9 December, 2002

INTRODUCTION

Historically, Roosevelt elk (*Cervus elaphus rooseveltii*) were endemic to the redwood forest ecosystem in northwestern California. Prior to settlement by early American citizens in the 1850's, Roosevelt elk were hunted by the Native Americans, with presumably minimal impact to the elk population. In addition, the Chilula burned the prairies of the Bald Hills regularly, probably in order to make food and plant material gathering easier for the tribe, and promote grass growth to attract wildlife (i.e., elk and deer). However, from 1848 to 1855 market hunting for elk hide and meat to supply gold miners during the northern California gold rush significantly reduced elk populations and distribution (USDI 1983). When the gold rush was over, settlement began and a great deal of elk habitat was burned or logged and converted for ranching cattle and sheep, and crop land use.

The only Roosevelt elk populations that persisted through this period were those occupying coastal lowlands in the northern part of California, where dense forests and brush fields provided protective cover. Mandel and Kitchen (1979) estimated the elk population to be 1,000 to 1,300, with roughly half being located in and around Redwood National and State Park's (RNSP). RNSP's long-term goal for resource management is to restore and maintain the park's natural ecosystem as it would have evolved without modern human technology. This includes restoring elk herds to pre-

settlement numbers and distribution and maintaining the population in equilibrium with the environment, regulated by habitat, predation, inter- and intra-specific competition and natural events.

Annual classification data of Roosevelt elk in Redwood National and State Parks has been undertaken since 1996 (Wallen 1997), in an attempt to document relative abundance and simple population characteristics, such as recruitment and calf survival within known herds. While long term monitoring such as this helps managers understand basic elk population dynamics within the park, it is not intended to replace more detailed investigations and research of the Roosevelt elk population within the park.

METHODS

During 2002, most of the elk classification counts during the spring and summer months (March-August) were conducted opportunistically by the Fish and Wildlife Branch staff while performing field surveys for other species. Field visits to herd areas from October through December were generally scheduled bi-weekly for classification counts, however some counts were made opportunistically while doing other field work. The elk classification counts were concentrated on 7 identified herd units (see below). Classification counts were performed by driving or hiking to the identified herd units, and also surveying historic and suspected areas were elk have congregated throughout the park. Using binoculars and spotting scopes, observers reported the total number of elk observed, and also the total number of elk within each classification group (see below). The observers also assigned an observation ranking criteria value to the classification count, identifying the observer's confidence in the count data (see below). Other RNSP staff and visitors also opportunistically reported elk counts at known herd units, and elk sightings in lesser or unknown elk use areas.

Herd Units

The herd units included in classification counts were as follows:

(1) **South Operations Center** (SOC) herd
(2) **Lower Redwood Creek** herd
(3) **Bald Hills** herd(s); (dispersed, several discrete herds)
(4) **Davison Ranch**/Berry Glen herd (considered the same herds)
(5) **Elk Prairie**/101 Bypass herd (considered the same herds)
(6) **Gold Bluffs Beach** herd(s); (dispersed, several discrete herds)
(7) **Crescent Beach Education Center** (CBEC) herd

Classification Groups

Elk herds are classed into groups by age and sex:

- **Cows** = all females >1 year old.
- **Calves** = young of the year (<1 year old; recognized early by spotted coat and small size; later the spots disappear, but they retain a short, rounded snout.)
- **Spikes** = year old males exhibiting only a main beam, brow tine absent.
- **Mature bulls** = ≥2 years, with brow tine evident off the main beam.

Observation Ranking Criteria

Rating criteria are used to evaluate the classification conditions and the observer's confidence in the count data:

1 = Good, visibility good and animals close enough to observe with high confidence accuracy.

2 = Fair, animals are either distant or not fully cooperative for good confidence in classification (e.g. observation time is reduced due to movement into cover).

3 = Poor, animals too far away (e.g. difficult to track individuals or animals are in adjacent hiding cover). Qualify the observation in the notes section.

4 = Unacceptable, bad visibility due to darkness, fog, uncooperative animals.

RESULTS

Classification counts were performed to determine the total number of elk within each herd unit, and also the total number of elk within each classification group (Table 1). That data were used to determine ratios of calves/cows (Table 2), and bull/cow ratios. The ratio of calves to cows is used an indication of herd productivity (e.g., more calves produced indicates a healthy herd).

Table 1. Highest number of elk reported within each herd unit and for each classification grouping (with average count ; standard deviation). MB= mature bull, SP= spike, CW= cow, CV= calf, n= total number of counts reported with ranking criteria <3.

Location	MB	SP	CW	CV	Total	n
SOC	**10**(6;3.6)	**0**	**8**(6;2.5)	**3**(3;0.6)	**18**(14;5.3)	3
Redwood Creek	**5**(3;1.8)	**4**(3;1.7)	**31**(20;14.0)	**7**(5;3.9)	**46**(30;20.1)	4
Bald Hills	**2**(1;0.7)	**3**(1;1.2)	**35**(13;12.0)	**7**(2;2.2)	**38**(17;14.2)*	14
Davison Ranch	**15**(5;4.8)	**2**(1;1.0)	**29**(13;11.9)	**6**(2;2.1)	**44**(21;13.8)	12
Elk Prairie	**1**(1;0)	**2**(1;1.0)	**9**(5;4.0)	**3**(2;1.2)	**15**(10;5.5)	3
Gold Bluffs Beach	**6**(3;1.7)	**4**(1;1.4)	**29**(11;10.2)	**6**(3;2.2)	**38**(17;13.0)	9
CBEC	**3**(2;1.0)	**2**(1;1.2)	**23**(15;8.2)	**5**(1;2.5)	**30**(18;10.7)	4

* Only subherds were utilized for calculations. Highest combined herd classification count for all of the Bald Hills of any given survey day was 65.

Table 2. Calves per 100 cows for identified elk herds, 1996 to 2002.

Location	1996	1997	1998	1999	2000	2001	2002
SOC	45	35	29	31	15	22	36
Redwood Creek	39	11	15	38	22	26	22
Bald Hills	25	20	32	32	21	19	20
Davison Ranch	23	27	18	23	41	29	21
Elk Prairie/Bypass	8	33	24	53	29	37	33
Gold Bluffs Beach	N/A	38	12	7	9	19	21
CBEC	N/A	N/A	N/A	N/A	13	N/A	22

South Operations Center (SOC) herd

Three calves were observed with the SOC herd in early July. Unlike last year where all calves were presumably lost to predation, all three calves this year appeared to have survived until mid December. The calf/cow ratio using the 3 observed calves and the highest cow count was 0.36. The bull/cow ratio was 1.3, which is considered extremely high, even for unhunted elk. The highest possible number of elk in this herd was 18.

Lower Redwood Creek herd

There were many visitor and staff reports of elk along the lower portion of Redwood Creek, downstream of the Tall Trees grove. While many of the reports were of a single elk, on average visitors reported seeing 20-40 elk along the creek corridor. The calf/cow ratio for this herd was 0.22 and the bull/cow ratio was 0.16. The highest possible number of elk in this herd was 46.

Bald Hills herd

The elk in the Bald Hills seem to be comprised of several discrete herds which have been observed near Ganns Prairie, Elk Camp, Airstrip, Childs Hill, Schoolhouse Peak and Maneze Prairies as well as the Coyote Creek and the Williams Ridge areas. There was one RNSP staff report of an elk herd of 100 plus during March of 2002 in the Coyote Creek drainage. Large aggregate herds have been seen in this area before in winter. With the exception of the herd of 100 plus, the highest possible number of elk in this herd derived from classification counts was 65 (a combined subherd count - only subherds were utilized for cow/calf and bull/cow ratio calculations in Tables 1 and 2). The calf/cow ratio for this herd was 0.2 and the bull/cow ratio was 0.05. The extremely low number of bulls observed in the Bald Hills is likely due to habitat (i.e. plenty of second growth and old growth redwood and oak woodlands to hide in) and human presence (i.e. receives some poaching pressure and hunting in adjacent lands outside park), rather than a true lack of bulls.

Davison Ranch / Berry Glen herd

This elk herd is one of the most visible and easily accessible herds in the park. Classification counts were typically conducted under good visibility and the animals were often close enough to observe with a high confidence in accuracy. The herd typically consisted of a group of mature bulls that occupied the northern portion of the meadow, and a separate group of cows, spikes, and calves that occupied the southern portion of the meadow. However, biologists did document the Davison herd occupying the old growth redwood stands and riparian area south of the meadow on occasion. The highest possible number of elk in this herd was 44, and the calf/cow ratio was 0.21. The bull/cow ratio was 0.52, with 15 mature bulls observed during one of the counts.

Elk Prairie / 101 Bypass herd

Unlike all previous survey years, this herd was extremely difficult to gain accurate counts of or even find and this is reflected in the small number of total successful counts (n = 3). Surveyors made repeated efforts to find this herd but were unsuccessful on most occasions. It appears that the herd has changed their primary

grazing range to the Highway 101 Bypass area and away from Elk Prairie. There are a number of spots along the Bypass which are hidden from the highway itself or are unsafe to stop to survey. It is probable that the larger numbers seen in previous survey years still exist in this herd but were simply not seen this year. In addition, Elk Prairie was burned in 2001 which may or may not have altered the forage component of the prairie thus resulting in a range shift. Finally, there is the unlikely possibility that significant numbers of elk died as a result of unknown vehicle collisions along the Newton B. Drury Parkway and Highway 101 Bypass. No mortality from vehicle collision along the Bypass or Parkway was reported to the Fish and Wildlife Branch this year. The highest possible number of elk in this herd was 15. The calf/cow ratio was 0.33. The bull/cow ratio was 0.11 bulls, with only 1 bull observed during counts.

Gold Bluff Beach herd

Similar to the Bald Hills herd, the Gold Bluffs Beach herd seems to be comprised of several discrete herds which have been observed from just south of Mussel Point to just north of Carruther's Cove. The most consistent sightings of a large herd occurred near the Ossagon Rocks. The highest possible number of elk in this herd was 38 with a calf/cow and a bull/cow ratio of 0.21. Small groups (<5) of elk or elk tracks were sometimes observed south of Major Creek and Mussel Point during plover and beach carcass surveys while small family groups and bachelor male groups were seen near the campground and Espa Creek.

Crescent Beach Education Center (CBEC) herd

Fish and Wildlife staff only visited the CBEC area twice during classification surveys. No elk were observed during these visits. However, some staff members stationed at CBEC did record elk in the meadows near CBEC when they observed them on an *ad libitum* basis. The highest reported number of elk in this herd was 30, the cow/calf ration was 0.22 and the bull/cow ration was 0.13.

Other

Small groups of elk and elk sign were reported in other areas of the park as well. For example, 3-4 bulls continue to be observed at the far east end of the Aubell facility while small family groups were reported along the Coastal Drive near Flint Ridge and as far south as the state prison grounds. Elk sign has also been seen upstream of the Tall Trees Grove on Redwood Creek as well as within the McArthur Creek drainage.

DISCUSSION

Harper et al (1985) reported that calf/cow ratios for Roosevelt elk in Oregon average 0.39 (range = 0.32 to 0.47). The Oregon estimates were from herd units that were subject to hunting mortality. In a late 1970's RNSP study, Mandel and Kitchen (1979) reported the approximate calf/cow ratio at 0.20. Similar to last year, the calf /cow ratios reported for the identified elk herds within RNSP during 2002 ranged from 0.20 – 0.36, with all but 2 herds below 0.30.

It is difficult to make meaningful comparisons of calf/cow ratios per herd from year to year, however, due to the variability in sampling. Observability of many herds is often difficult which results in low numbers of sample counts which in turn may mean that current ratios do not accurately reflect real changes in calf production. For example, herd observability can change from year to year, as was evidenced by the Elk Prairie/101 Bypass herd this year. In previous years this herd was one of the most easily surveyed because of its regular use of the open Elk Prairie. This year, however, the herd rarely used the area. In addition, widely dispersed herds in the Bald appear to keep to areas of cover in the fall making reliable calf/cow counts difficult. The herds begin to group together in winter, when the calves have grown larger and are harder to differentiate from yearling cows. Combining the data from all observations in these areas does not provide a truly accurate cow/calf ratio, however it may be an accurate estimate of particular sub-herds when they are located. The Bald Hills herds undoubtedly receive some poaching pressure, making them difficult to observe for any length of time. The adjacent commercial timberlands are also open for hunting for 10 days in September, which appears to send park herds to remote prairies.

As with previous years, the Gold Bluffs subherds remain relatively habituated, and observations can be made of individual groups; however, their dispersal throughout the beach corridor makes it difficult to ascertain discrete units. The smaller herds at SOC, Davison and lower Redwood Creek areas tend to group together in more discrete units, making cow/calf ratios easier to determine. These herds tend to be more habituated to humans, so observations are often more reliable. Besides all these those caveats, productivity remained similar to previous years as measured by cow/calf ratios.

LITERATURE CITED

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